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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,219	12/21/2001	Cyprian E. Uzoh	042496/0269264 NT-235	3469

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EXAMINER

CHEN, KIN CHAN

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 08/20/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	Application No. 10/032,219	Applicant(s) UZOH ET AL.	
	Examiner Kin-Chan Chen	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 112

1. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, last three lines, "will electropolish" (two occurrences) is vague and indefinite because it is unclear whether electropolish is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-9, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh (US 6,582,579).

Uzoh teaches a method for planarizing a non-planar conductive surface. A conducting material may be applied onto a top surface of the conductive surface layer using a method that does not involve electroplating so that a top surface of the conducting material layer is planar, thus forming a planarized multi-layer structure that includes the non-planar conductive surface layer and the conducting material layer.

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The planarized multi-layer structure may be electropolished (col. 5, line 34 – col. 6, line 15). Since the conducting material and the conductive surface layer are similar materials, the electropolishing of both layers at substantially the same rate would have been expected.

Uzoh does not explicitly state that at least portions of the non-planar top conductive layer may be removed along with portions of the conducting material layer. However, because electropolish process is not completed instantaneously, it would be obvious to one skilled in the art that at least portions of the non-planar top conductive layer may be removed along with portions of the conducting material layer during electropolishing.

As to dependent claims 15 and 16, Uzoh teaches using electropolishing. Uzoh is not particular about the process. Hence, it would have been obvious to one with ordinary skill in the art to use ECME or electrochemical etching process because it is one of the most popular methods of electropolishing.

The above-cited claims differ from the prior art by specifying well-known features (such as annealing process /diffusion process; removing layers using CMP, wet etching, or RIE) to the art of semiconductor device fabrication. A person having ordinary skill in the art would have found it obvious to modify Uzoh by adding any of same well-known features to same in order to provide their art recognized advantages and produce an expected result.

4. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayer et al. (US 6,315,883; hereinafter "Mayer") in view of Shue et al. (US 6,083,835; hereinafter "Shue").

Mayer teaches a method for planarizing a non-planar conductive surface. A conducting material may be applied onto a top surface of the conductive surface layer using a method that does not involve electroplating so that a top surface of the conducting material layer is planar, thus forming a planarized multi-layer structure that includes the non-planar conductive surface layer and the conducting material layer. The planarized multi-layer structure may be electropolished. At least portions of the non-planar top conductive layer may be removed along with portions of the conducting material layer (col.9-11; Figs. 4-7).

Mayer does not teach that the conducting material and the conductive surface layer may be electropolished at substantially the same rate. In a method of planarizing, Shue teaches that a layer of copper alloy may be deposited over the damascene wiring trench using any of several methods and then electropolished in order to prevent any dishing effects (col. 3, lines 26-38). Hence, it would have been obvious to one with ordinary skill in the art to modify Mayer by using a layer of copper alloy as taught by Shue in order to prevent any dishing effects. Furthermore, because the combined Mayer and Shue has the conducting material that is similar to the material of the conductive surface layer, the electropolishing of both layers at substantially the same rate would have been expected.

As to dependent claims 10-14, Shue is not particular about forms of the material (e.g., slurry, power, or emulsion) and method for applying the conducting material. Hence, it would have been obvious to one with ordinary skill in the art to use commercial available form of material (e.g., slurry, power, or emulsion) and method in order to accommodate various dimensions and product requirements. Thus, claims 1-14 are rejected for the same reason, *supra*.

As to dependent claims 15 and 16, the combined prior art teaches using electropolishing. the combined prior art is not particular about the process. Hence, it would have been obvious to one with ordinary skill in the art to use ECME or electrochemical etching process because it is one of the most popular methods of electropolishing.


The above-cited claims differ from the combined prior art by specifying well-known features (such as annealing process /diffusion process; removing layers using CMP, wet etching, or RIE) to the art of semiconductor device fabrication. A person having ordinary skill in the art would have found it obvious to modify the combined prior art by adding any of same well-known features to same in order to provide their art recognized advantages and produce an expected result.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's

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supervisor, Nadine Norton can be reached on (703) 305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.

A handwritten signature in black ink, appearing to read "K. C. Chen", with a stylized flourish at the end.

Kin-Chan Chen
Primary Examiner
Art Unit 1765

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